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Original Articles.

TYPHOID FEVER AS RELATED TO THE NERVOUS SYSTEM.

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AFTER those which are directly due to the enteric lesion, the symptoms which arise in this disease, are almost wholly referable to the nervous system. So prominent indeed, is this line of expression, that nervous fever was for a long time the name under which the malady was known.

From a practical point of view, it is important that the significance of these symptoms should be understood. They have diagnostic importance throughout, and frequently are amongst the earlier diagnostic criteria. They influence materially prognosis, and largely determine the course of the attack. They afford, often, valuable indications for treatment.

The continuous headache, the weariness of the limbs, the depression of spirits and the general aching, bring patients to the notice of the practitioner in the prodromic period, quite as often as do diarrhœa, or abdominal tenderness, and frequently the former are the guides to the examination which reveals the latter.

Long before the rose colored spots and the doughy feel and gurgling sensation of the right iliac region have given a final confirmation, the physician has generally risked a positive statement of the nature of the case, based mainly, often wholly, on the complement of nervous symptoms presented.

The occurrence of delirium, its extent and character, the capacity for sleep, the muscular power, the tendency to adynamia are as anxiously regarded as the state of the alimentary canal, and as much relied on for a basis of opinion as to the duration and outcome.

In estimating the nature of the affection, we must not allow ourselves to be misled by the prominence of the nervous symptoms, into forgetting that they are secondary in occurrence. We must rather see in it, the ultimate relation of the blood (in which it may be assumed that the primary changes occur) to the nerve tissues.

No other tissue has so complex achemical composition. From no other can so many different chemical substances be obtained. The highest degree of delicacy of structure, complexity of composition and elaborate organization, necessarily connects itself with the most intimate relations, and with the most constant dependence on the nutritious supply. A toxic principle within the blood and lymph channels is equivalent to the presence of the same in the nervous tissues. Any incapacity on the part of the blood, to properly supply nutritious material or to adequately remove waste matter, will most quickly be resented by the nervous system.

To the common causes, all parts are equally exposed—centres, peripheral end organs and connecting fibres. The sum total of the nervous symptoms may then be regarded as depending on:—

1st.—The presence in the cells and fibres of the virus, which is the essential cause of the disease.

2nd.—The changes in metabolism of the nervous tissues, due to alterations in the blood and other organs.

3d.—Grosser (organic) changes resulting from the above causes.

4th.—Organic changes due to continued high temperature.

I will consider the last division first, since nothing in what has preceded gives the ground on which it rests.

Among the many (about fifty) different chemical bodies which have been obtained from the nervous system is amidomyelin. This body, when obtained in a clear watery solution, will coagulate when heated to 107 F. Here, then, is a change of state, resulting from a temperature occasionally reached in typhoid fever. Such a change as this may be altogether impossible while this substance is in the relations in which it exists in the living body, and, even granting that it may occur, may have no special effect on the function of the part in which it is found. But it is far more rational to draw a different conclusion, and to believe that deleterious changes may occur, which are the result of abnormal temperature, within the limits wherein they are so gross that they are demonstrable in the chemical laboratory, when they are tested by the infinitely finer reactions of living protoplasm. Nor is it necessary to suppose that the prejudicial effect of high temperature falls only on this one constituent, when many of them rest for their normal balance on very delicate conditions. Clinical observation has long ago settled the connection of long continued high temperature with danger to life, and has, at the same time, coupled this danger with interference with the function of the higher nerve centres. I wish here to introduce a word of caution. While hyperepyrexia (105° and upwards) affords an undoubted indication for treatment, and may warrant resort to special and heroic measures, the routine introduction of the depressing antipyretics, such as antipyrin, antifebrin, etc., in cases where the temperature remains under the mark above indicated, has always seemed to me injudicious. A drug which reduces temperature, but nothing more, may do good when the temperature is what threatens to destroy the nervous system, but it must not be forgotten that when this is not the case, it may deprive this very organ of certain resisting influences, which are inherent in moderate elevation, and which defend against the destructive tendencies of the conditions embraced in my first three classes of causes.

The presence of the specific toxic principle, it may be supposed, alters the constitution of the nervous element, and hence affects its molecular activity. While it is impossible to speak in the present state of knowledge, in precise terms, of what we mean by molecular action, I take it that in the minds of most men it stands as an idea for the mode in which the ingredients of a definitely constituted body react upon each other in order to maintain that definite constitution. Altering that definite constitution by the addition of another ingredient would necessarily change the molecular action, according to this view, and if function is the result of molecular action, then it would mean alteration of function. A living cell must be looked upon as normally capable of ready change in its chemical constitution, and hence, so to speak, of ready functional change from rest to activity (for rest is a normal function, as well as activity). Following out this thought it is easy to conceive of functional disturbance in case of the introduction of a foreign or new element into its chemical composition. Such disturbance may associate itself with both the functional phases of rest and activity and hence is closely allied to the metabolic processes.

Metabolism in any tissue involves the functions of the blood and lymph, absorbing their power of replenishment and removal. It is readily seen that failure in this direction, must result in a condition analogous to that above described, deviation from the normal constitution, and that the consequence must again be alteration of function. The work of the blood in effecting metabolism implies its normal composition. The known alterations of this fluid in typhoid fever may be appealed to in support of my second proposition. It is a significant fact that sluggish bowels are often present in the graver types of nervous complications in this disease, and the explanation very probably lies in the absence of

active elimination from the blood of both the poison of the disease and the autogenetic products of nervous katabolism which consequently accumulate in the nervous system.

The efficiency of typhoid fever as a cause of chronic disease of the nervous system, which involves the presence of degenerative processes, may be mentioned in support of my third proposition. It is impossible to escape the conviction, that where such results do not follow, slighter organic changes have occurred, if we regard thoughtfully the protracted convalescence, the slow return of muscular power, the continued apathy and the correspondence of the period of restoration with that of complete nerve regeneration.

1624 DIAMOND STREET.

THE DIET IN TYPHOID FEVER.

BY WILLIAM F. WAUGH, M. D.

ACCORDING to Hoffman,[1] the salivary glands in typhoid fever exhibit almost constant alterations. In the first week they are denser and firmer, brownish-yellow and tense. The septa are like cartilage, and creak on section. The acini are filled with closely crowded, very large, multi-nuclear, granular cells. Later on numerous fatty granules appear in these cells; they become turbid, lose their sharp outlines, and a part breaks down. The glands then become redder and softer, and the tension diminishes. It seems then that we have here a parenchymatous degeneration, differing from analogous processes in other organs only in that an increase of the cells precedes the degeneration.

These changes, in which all the salivary glands participate, explain the scantiness of the saliva. The pancreas also exhibits perfectly analogous changes.

The secretion of bile is often markedly diminished. The hepatic cells become granular, the nuclei disappear, and fat globules are visible. In bad cases the cells break down into granular, amorphous detritus. In 174 typhoid livers Hoffman found only thirty-eight presenting little or no change; while all the others showed marked degeneration and destruction of the cells, or marked new growth. The secretion of bile is often quite scanty, as may be inferred.

[1]Ziemssen's Cyclopedia, vol. I, p. 113.

In the intestines the affection of Peyer's patches and of the solitary glands is acknowledged to be the characteristic primary lesion of the disease. But the remaining tissues of the bowel do not wholly escape. In the first week the mucous membrane is hyperemic and swollen, even before the infiltration of the glands appear. This latter process does not occur simultaneously in all the glands, as in the fourth week we may find, in the same intestines, ulcers cicatrizing, others with adherent sloughs, and fresh infiltrations. Nor do all the affected glands undergo necrosis, for even in the severer cases, at the end of the second week, resolution sets in in the patches not already devitalized.

It is necessary also to remark that all the glands are not affected by the morbid processes. In a large number of cases the solitary follicles entirely escape; in many others those of the ileum are alone attacked, and when those of the large bowel suffer it is often only in the cœcum or in the ascending colon. The same thing is observed of Peyer's patches; the highest of them are very seldom, if ever, affected.[1] No special lesion of the stomach is described by Liebermeister, Strumpell or Fagge. Wilson says that this organ is in many cases healthy, but occasionally it is the seat of hyperemia, softening and superficial erosions of the mucous membrane.[2] The secretion of the gastric juice is, however, partially or wholly suspended, as is the case with the other digestive secretions

The condition of the digestive system during an attack of typhoid fever, as shown in this brief sketch, warrants our first proposition; that during the course of this fever the power of digesting food is impaired, always seriously, and sometimes almost entirely lost; from the morbid processes going on in the tissues of the digestive tract, and from the suspension of secretion.

My second proposition is, that food that will not be digested in the stomach or bowels of a typhoid fever patient, is not only useless but harmful; as in the absence of digestion, decomposition is certain to occur, with the production of

[1]Fagge's Practice, vol. I, p. 200.

[2]The Continued Fevers, p. 203.

substances that are certain to be injurious to the patient. I must refer to this cause the tympanites that occasions so much trouble in improperly fed cases. I am assured by the results of numerous observations that this symptom does not become prominent, or even noticeable, when the diet is properly guarded.

The conclusion is, that in typhoid fever the stomach and bowels should not be looked upon as digestive organs, but simply as receptacles for food that has been previously digested.

That absorption may take place cannot be denied. The whole gastro-intestinal mucous membrane is adapted for absorption. Saline solutions, grape sugar and peptones, are absorbed from the stomach. The most active area for absorption is the upper half of the small intestine—the section least affected in typhoid fever. While this absorption is diminished by the presence of catarrh, it is not entirely lost. But as the catarrh, as well as the graver affection of the intestinal glands, become more marked as we proceed downwards from the stomach, the indication becomes very clear: that in typhoid fever we should employ such food-principles as are absorbed from the stomach and the upper bowel. Our list, then, of available foods, comprises water, salts, peptones, maltose and dextrose; while casein, egg-albumen, dextrin and gelatine are not absorbed with the same readiness. As fatty substances are principally absorbed by the lacteals, but little of these can find entrance to the system.

We now come to consider the application of these principles in practice. In France, the obstacles to digestion and absorption appear to be exaggerated. Assuming that only salts and water can be absorbed, and that the patient practically lives upon his tissues, Dujardin-Beaumetz returns to the Hippocratic diet, of water-soup.

Liebermeister insists on the importance of giving abundance of water. He objects to the proteids, and falls back upon the carbo-hydrates, barley-water, oatmeal gruel, and weak meat-broth. Milk may be given, if boiled and diluted. Later in the attack, the yolk of an egg may be added. Very feeble patients may have beef-tea with claret, or perhaps Leube's pancreatized beef enemas.

Strumpell recommends milk, with coffee, brandy, or cocoa added; Nestle's milk food; broth thickened with rice or sago; zwieback; with an egg or raw beef for very feeble cases. Beef tea is strongly recommended. Meat peptones may be sometimes useful.

None of the writers quoted appear to have had a clear conception of the pathological conditions present, or of the physiology of digestion. Soups depend on gelatine; milk on casein; the yolk of eggs on albumen and fat; the carbo-hydrates mentioned on unconverted starch; beef tea on innutritious extractives. None of these are suited to the conditions present. Liebermeister is right in insisting upon the liberal use of water. The digestion is thereby improved, and the emaciation largely prevented. If patients do not ask for it, water should be given systematically, in stated quantities. Milk should be administered only when predigested. Recently I have employed the Fairchild peptonizing powder, and with good results; better than when employed for children's diet. Kumyss is better still, when some stimulant is required. The raw white of egg, treated with pepsin, and dissolved in ice water, is always acceptable. As this is wholly digested in and absorbed from the stomach, it is especially applicable. Junket, milk digested with rennet, comes under the same category. To these I will add two of the manufactured foods—Bovinine and Carnrick's Infant Food. I do not wish to be understood as condemning other foods of this description, but simply to state that my experience has been largely confined to these two. I began their use years ago, and the results have been so satisfactory that I have not found it advisable to experiment with others.

Notwithstanding the hebetude in which the patient is wrapped, he will often note the nature and taste of the food offered; and for this reason, as well as others, it is best to vary the articles given. It is my custom to alternate the use of the Carnrick's food, peptonized white of egg, and junket, giving a cupful of either every two hours, in alternation, and with each one a small quantity of Bovinine; from ten drops to a tablespoonful, generally a teaspoonful. This may be given in the other food, or in a little porter sangaree. Another most useful article is coffee, made with milk instead of water. With

this a dose of pepsine must be given, say a teaspoonful of Procter's wine. The Carnrick's food consists of milk already digested, and of soluble carbo-hydrates; so that all its elements can be absorbed speedily from the stomach. The Bovinine consists of beef's blood, egg albumen, whiskey and glycerine.

The action of this food is peculiar, and somewhat complicated. As a food, nothing is so readily absorbed as egg-albumen and blood, as nothing comes so near the composition of the human blood. The glycerine assists in keeping the bowels soluble; the whisky is a useful stimulant and the boric acid assists the antiseptic remedies with which most practitioners now treat typhoid fever. But there is something more than this in Bovinine. Some years ago I mentioned this, and called attention to the fact that in blood we have a substance that has been not only digested and assimilated, but *vitalized*. It is a living fluid, whose existence is identical with that of the individual in whose arteries it flows. I speak simply as a clinical observer; but I feel sure that when the science of biologic therapeutics has progressed a little farther, we will be furnished the reasons for my present claim, that there is in blood, as a food, a value not wholly explicable by its chemical composition. Stern has shown that human blood-serum is destructive to the Klebs-Eberth bacillus, and that the serum of persons convalescing from typhoid fever has an attenuating effect upon the toxicity of typhoid bacillus cultures. The effect of the serum of animals insusceptible to typhoid fever seems to be the next step for investigation.

The net results of the application of the diet herein recommended are these: 1. Avoidance of the gastro-intestinal irritation due to undigested food. 2. The sustaining of the patient's strength, by really feeding him (as distinguished from the mere placing food in his stomach), and the consequent avoidance of collapse, and all the long train of ills that come from mal-nutrition. 3. The avoidance of the excessive emaciation so often seen after protracted attacks of typhoid fever. 4. Shortening of the convalescent period. 5. I put forward, tentatively, my impression that the secondary degenerative lesions of muscles, nerves, and other tissues, are not wholly due to continued high temperature, but, in part at least, to innutrition; and that these lesions are not nearly so marked when the patient has been fed upon the system herein advocated.

TWO ILLUSTRATIVE CASES WITH PECULIAR SYMPTOMS.

In the latter part of August, a young man employed at Cramp's ship-yard applied to me for relief from a severe pain in the head, following a heavy blow on the left temple. The pain was most severe at the site of injury, and close examination detected a slight depression of the frontal bone at that spot. The pain did not subside, although he was confined to his room and kept on low diet, with cold to the head and arterial sedatives. In a few days fever manifested itself, worse at night, with a slight tendency to delirium, together with tympanites, some diarrhœa, tenderness in the abdomen, anorexia, and a typical typhoid tongue; "small, pointed, red at the tip and edges," with a tendency to dryness, and brownish along the middle. The typical typhoid spots appeared a few days later, and the urine responded to Ehrlich's test. The onset of the specific fever had been masked by the symptoms resulting from the very severe injury received on his temple. This accounts for his not being placed on the sulphocarbolate of zinc at the beginning of the attack. About the fifth day of the attack he was placed on this treatment; his temperature at that time being nearly 105° in the afternoon. He was given one of Upjohn's 2½ grain, keratin coated pills every two hours, until the stools became natural; after this he took the pills every four hours until the temperature returned to normal. The usual results followed the administration of the zinc salts; the temperature fell to 103°, and never afterwards exceeded that height, ranging from 101° to 102.5°, as a rule. The abdominal symptoms subsided, and were not marked during the rest of his illness. The headache became less after the first week, but did not entirely leave him until convalescence was fully established. Successive crops of rose spots appeared.

The patient was under treatment for thirty-two days; so that the duration of the case was not materially shortened, although its severity was much amelior-

ated. During the first three weeks he took scarcely any nourishment excepting Bovinine, of which he was given a teaspoonful every two hours, night and day.

About the end of the third week he began to take peptonized milk and Carnrick's food; and these two articles were continued as long as he was confined to his bed. There was not nearly as great a degree of emaciation as is usual after attacks of typhoid fever lasting nearly five weeks.

On November 17th, six weeks after he was discharged from treatment, he reported, looking and feeling very well. The pain in the temple still tends to recur on any undue excitement; and he has consequently been advised not to return to his work until all cerebral uneasiness has disappeared. He is, however, able to fully enjoy a day with his gun and dog, without any unpleasant symptoms appearing.

November 3d, I made my first visit to Kenneth Waer, aged thirteen, living at Gray's Ferry. He had then presented symptoms of typhoid fever for nearly a week. His temperature was 104° in the evening, pulse 120 and dicrotic, though not specially weak. He had but little diarrhœa, but the abdomen was some what distended, and tender at the right iliac fossa. The tongue was small, dry, pointed, red at the tip and edges. Two rather doubtful spots were detected on his abdomen. The urine responded rather obscurely to Ehrlich's test. The temperature was not taken systematically, but what records were made corresponded to the typhoid type; the fever was always higher towards evening. It was looked upon as a doubtful case, the probability leaning towards typhoid fever. He was placed upon the sulpho-carbolate of zinc, gr. ij. every two hours, afterwards every three hours. On November 22d, he was discharged as well; the temperature having been normal for several days. During the entire attack he was fed on Bovinine and Carnrick's food, with a little coffee. The temperature never reached 103° after the zinc salt was given. The boy is still weak, but has lost scarcely any flesh, and is with difficulty kept in the house. (This is the report on November 22d).

This is a typical case of a numerous class. They look like typhoid fever, more than anything else; indeed, if they are not typhoid, one is at a loss how to classify them. They are not malarial, nor are they due to any local affection discoverable by examination during life; and as they all recover, autopsies are not available. Nor are they influenza; as such cases were often se n before the influenza epidemic; and they do not present the peculiar features by which *la grippe* may be recognized even in his protean disguises. Previous to the use of sulpho-carbolate of zinc, cases similar to these usually developed into unmistakable typhoid fever. At present, we must be content to call them "probably" typhoid, until we can verify the diagnosis by bacteriological tests. At any rate, they recover, *tuto, cito, et jucunde*, under the sulpho-carbolate treatment.

SOME COMPLICATIONS OF TYPHOID FEVER.

By PROFESSOR GRANCHER,*
PARIS, FRANCE.

I PRESENT to you to-day a boy of twelve years recovering from typhoid fever. During the evolution of the disease, two interesting complications have occurred; a suppurative synovitis and a phlegmasia alba dolens.

This boy was sick from the beginning of November; he complained of headache, weariness; there was loss of appetite. On the 10th of November, the symptoms increased; he had to take to his bed. His state grew rapidly worse; nausea, vomiting, diarrhœa set in; a very intense fever developed; he was brought to the hospital and admitted, ward Bouchut, on the 13th of November.

On the 14th the little patient is found in the following state: slight prostration, tongue tremulous, red at the borders, white in the middle, coated; his nostrils are encrusted; there is nothing in the throat No nausea, no vomiting. Slight diarrhœa; the abdomen is rather retracted than ballooned; both iliac fossæ are tender on palpitation; the spleen is enlarged. Bronchitic rales are heard over both lungs; the heart is normal, the pulse regular, non-dicrotic (100 pulsations.) There is no albumine in the urine.

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The diagnosis of typhoid fever is then made and confirmed in the following days. Rose-colored lenticular spots appear. The prostration increases. The temperature oscillates about 40 C. (104° F.)

The treatment consists of mild purgatives, given in daily enemata; every day from 1.0 to 1.5 grm. sulphate of quinine are administered; later on, salol (1 gramme).

The disease follows its usual course without exhibiting anything abnormal. From the 21st the temperature began to come down, wavering, however, between 38° and 39° C. (100⅘ to 102⅕° F.)

On the 24th an incident occurs. The boy complains of pains in the lower limbs (thighs and legs). These pains continue on the following day, vague, not localized, only on the 26th, there is found, at the level of the left instep, a slight redness of about three fingers breadth. Pressure is painful at that point; the motions of the toes enhance this pain.

The temperature still oscillates between 38 and 39° C. The general state of the patient is less good.

In spite of the use of mercurial ointment, the inflammation at the back of the foot progresses; pus collects in the tendinous sheaths. On December 4, fluctuation having become evident, an incision is made into the purulent focus. An examination of the cavity with a probe shows that the bones are intact and that we are dealing with a suppurative synovitis.

The examination of the pus made by Mr. Veillon, my laboratory chief, shows that the bacillus of Eberth was alone in the purulent collection.

Recovery was soon complete. No other complication was noted till on the 9th of December. For several days past some irregularities, on the side of the heart had been observed; they were, however, but transitory, merely functional disturbances. On the 9th of December the temperature, which was normal the preceding days, rises in the morning to 37.6° C. (99⅕°F.), and to 38° C. (100⅘°F.) in the evening. The boy feels some pain in the left thigh.

On the 10th of December the thermometer records 39.4° C. (103° F.) in the morning, and 40.3° (104⅘°) in the evening.

The pain in the thigh has increased; on palpitation a hard string is felt, formed by the obliterated internal saphenous vein. Pressure is painful at that spot. We have to deal here with a phlegmasia alba dolens. The sore limb is put in a grooved splint.

On the 11th, the temperature rises to 40.7° C. (105⅕ F.) in the morning and to 41° C. (105⅘ F.) in the evening. On the following days, the same state of things prevails, the phlegmasia does not increase but the general condition gets worse. Prostration again appears. The tongue becomes coated anew. Diarrhœa sets in and on the 15th, rose-colored, lenticular spots are found on the abdomen.

The boy has had a relapse of typhoid fever. This relapse behaves fairly well; it is slight, for as early as on the 17th, the temperature falls to 39° C. (102⅕ F.) and gets gradually still lower. It reaches 37° C. (98⅘ F.) on the 19th, to stay henceforth normal, except once, on the evening of the 22d, when, doubtlessly on account of some fault of diet, it reaches 39.6° C. (103⅕ F.)

The phlegmasia gradually disappears. On December 28th, the string formed by the saphenous is felt only at the level of the knee. The splint is taken off.

To-day, January 6th, 1892, the recovery is about complete

Here, then we have a boy of 12 years of age who in the course of a typhoid fever of an average intensity, gets up first an abscess of the tendinous sheaths of the dorsum of the left foot, the pus of which containing but Eberth's bacillus, then a phlegmasia alba dolens, which still persists, at the level of the knee, in the shape of a hard string, and which obliges us to be very cautious. The patient has had moreover a relapse, characterized by fever, an aggravation of the general condition, by rose-colored spots and diarrhœa.

The case of this patient allows of certain developments which I think useful to impart to you. First of all, is suppuration a frequent symptom in the course of typhoid fever, and do we understand this phenomenon well? In this case, the suppuration of the tendinous sheaths was solely due to Eberth's bacillus. This bacillus then does not cause only typhoid phenomena; it is sometimes

pus producing. But we must know that the suppuration, so frequent in the course of typhoid fever (osteoperiostitis, abscesses of the cellular tissue and so forth) are often depending on the ordinary microbes of suppuration, the staphylococcus pyogenes aureus, for instance. It is very important to distinguish these different causes of suppuration, one from the other.

You easily perceive the utility of this distinction; you understand that it is not an indifferent thing that a typhoid fever patient should get up an abscess from Eberth's bacilli in the course of a disease, at a moment when one had the right to think him entirely cured. This persistency of the infection is interesting to note. There is something peculiar here, not unlike recurrent erysipelas.

Cases of suppuration from Eberth's bacilli are not rare. In a communication made to the *Société medicalé des hopitaux*, (February 20, 1891), in reference to a typhoid fever case, complicated with an abscess of the abdominal wall from Eberth's bacilli, Dr. Raymond has collected most of the cases of this kind published during the last years.

The first is that of A. Frænkel, who found Eberth's bacillus, exclusively of all other bacteria, in a focus of encapsulated peritonitis. Travel observed the same condition in a case of suppurative orchitis, occurring during a convalescence from typhoid fever. Roux and Vimay have studied an abscess of the spleen, in a typhoid fever case that died on the 18th day. Plate cultures revealed the exclusive presence of Eberth's bacillus.

Martha has published two cases of osteoperiostitis, due to Eberth's bacillus; no cultures having however been made, these cases can hardly be adduced as proofs. Valentini has found the same microbe alone in a subperiosteal abscess of the tibia, and in the pus of a suppurative pleurisy; Ebermayer, in two cases of suppurating periostitis of the tibia; Orloff, in a periostitis, eight months after a typhoid fever; Kamen, in a meningitis complicating typhoid fever; Colzi, in an osteo-periostitis of the tibia; finally, Ochalme has published a very complete observation of a typhoid fever patient, who, during his convalescence, had an osteo-periostitis of the tibia, caused by Eberth's bacillus alone.

The enumeration of these cases shows that all the tissues may be attacked, since cases of peritonitis, orchitis, pleuritis, meningitis, osteo-periostitis, have been observed, all due exclusively to Eberth's bacillus. Of all those complications, the osteo-periostitis of the tibia seems to be the most frequent. The objection was of course raised, long even before these cases were published, that it has not been proved that Eberth's bacillus alone is capable of producing pus; that, if other pyogenic microbes have not been found in those cases, it was because they had disappeared, after playing their part, and that Eberth's bacillus was added afterwards.

Demonstrative experiments have answered this objection. Gilbert and Girode (Société de biologie, 1891.) have caused a purulent peritonitis by injecting into the skin of the back of a guinea-pig a centimeter cube of a broth culture of Eberth's bacilli. The cultures obtained allow us to state that the peritoneal pus contained but one microbic species, that of Eberth. The experiments of Roux, Chantemesse, Gasser, Orloff, Colzi had previously demonstrated the pyogenic properties of Eberth's bacillus. Nay, even when dead, this bacillus can produce pus, as Orloff has observed; in this it would resemble the bacillus of tuberculosis. The pyogenic qualities of Eberth's bacillus cannot therefore be doubted.

This micro-organism can persist for a long time in the tissues it has invaded, and its presence explains the possibility of successive relapses of typhoid fever, at a date remote from the onset of the disease. We thus understand the cause of those recurrent autumn fevers which formerly could not be satisfactorily accounted for. One of the most curious cases, in this respect, is that of a patient of Dr. Chantemesse (Societé medicale des hopitaux, July 12, 1891). For five months he could not get rid of his typhoid fever and had a relapse, with rose-colored spots, every time his convalescence began

Dr. Chantemesse, in reference to this patient, inquired how long the typhoid fever bacillus could live within the human body. He stated that it was unhappily impossible to indicate the utmost limit beyond which the typhoid virus would cease to be living in the patient's organ-

ism. The limit of six to eight weeks from the outset of the disease, true in the majority of cases, does not imply that the bacillus has always so short an existence.

In a case published by Orloff, Eberth's bacillus was discovered, six months after the beginning of typhoid fever, in a state of purity, in a focus of a very painful periostitis of the tibia. This focus was formed by a grayish granulation tissue. Eberth's bacillus has not produced pus in this case, but a granular tumor. Suppuration is moreover pretty rare in consequence of typhoid periostitis, as Dr. Barrié has observed, in the discussion following Dr. Chantemesse's communication. According to Dr. Rendu, there is suppuration whenever the process is rapid; there is none, if it is slow.

In a personal case of his, Dr. Chantemesse has observed an osteitis of the tibia; in a man of twenty-nine years, three years after a typhoid fever. The bony lesion may have been due to the typhoid bacillus, but this lacks proof.

It cannot be stated precisely how far visceral complications, following a long time after typhoid fever, depend effectively on the presence of Eberth's bacillus in the organism. It is certain, however, that some typhoid fever patients harbor bacilli for months, and are thus liable to complications more or less severe.

Does this mean, as Dr. Chantemesse thinks, that in those cases, typhoid fever has an evolution like that of a chronic disease? No; those typhoid fevers with late complications are recurrent diseases due to a latent infection; it is not exact to call them chronic diseases.

Eberth's bacillus does not only produce pus; you have already seen that in Orloff's case, it had caused a granular subperiosteal tumor. Dr. Fernet has presented to the *Société medicalé des hopitaux* a patient in whom a typhoid fever followed immediately a sero-fibrinous pleurisy, the exudate of which contained but the bacillus of Eberth. Hence Dr. Fernet wondered whether one could not establish a group of pleuro-typhoid diseases, analogous to the pneumo-typhoid. Such is also the opinion expressed by Dr. Talamon, who has reported two cases of typhoid fever following in the wake of a serous pleurisy.

Eberth's bacillus does still more, as you may have felt convinced by examining little Louisa Masson, nine and a-half years old, admitted into ward Parrot, No. 25, on the 16th of November. Whilst all the symptoms of a severe typhoid fever were found in this little girl, the fact was also noted that the heart was beating very rapidly, with a fœtal rhythm (136 pulsations). These phenomena were disquieting; they indicated a weakness of the cardiac contractions; you know well of what import the state of the heart is for the prognosis. I would rather have a typhoid fever of 40°, 41° C. of temperature and regular energetic cardiac pulsations, than a typhoid case with a low temperature, but with cardiac contractions that are irregular, or have the fœtal rhythm.

The existence of the fœtal rhythm in the heart showed a change in the cardiac function and made us dread a quick or sudden death, as it often happens in the course of a myocarditis. No mishap did however supervene: the heart of our little patient gradually grew stronger; convalescence set in pretty rapidly and followed its course, without an accident.

To-day the child is cured, but a cardiac hypertrophy is remarked that did not exist before her typhoid fever The apex is beating in the fifth interspace, instead of in the fourth. This hypertrophy adds to the probability of the diagnosis of myocarditis which we have made during the access.

Now the question comes up whether Eberth's bacillus can cause a myocarditis. Dr. Chauffard, in a clinic on myocarditis of typhoid fever thinks that the heart lesion does not directly depend on Eberth's bicilli, but on the products of their secretion; this would mean an intoxication. He has however adduced no proofs of this view. I confess that, on account of the early time in which the accidents set in, I understand the lesions of the myocardium better by the localization of the bacilli in the cardiac fibre, than by the action of their toxine.

Bacteriological investigations have so far been made very incompletely. The alterations of the cardiac fibre have indeed been studied histologically, but the microbes have not been looked for in those cases in which the heart is soft, of

the color of a dead leaf. Rattone of Parma, in 1888, has published a paper on this subject. He says he has seen in the vessels of the heart, infiltration, of bacilli. We are therefore obliged to admit that Eberth's bacillus may locate in the heart; there is nothing astonishing in this, since it wanders everywhere,

It can also cause orchitis and phlebitis; it is possible that in our first patient, the phlegmasia alba dolens was due to an arrest of those bacilli; on the walls of the internous saphenous vein.

Eberth's bacillus moreover can cause typhoid infections outside of typhoid fever. A report by Charrin, (Société medicalé des hopitaux March 17, 1891,) is very convincing in this respect. It was about an adult who had died of a hemorrhagic pleurisy. The liquid contained but Eberth's bacillus. There were no intestinal lesions present, no swelling, no turgescence of Peyer's patches. It was a case of typhoid infection without intestinal lesions. It is probable that, in this case, Eberth's bacillus had not gained entrance through the intestine, but in some other way, through the lungs perhaps.

Dr. Vaillard describes a mixed infection from the typhoid bacillus and the strepto-coccus (strepto-typhoid septicæmia,) setting in with the symptoms of a rapidly progressing typhoid fever of a very severe type. The infection may be mixed from the start, or become so secondarily. The strepto-coccus enhances the virulence of Eberth's bacillus to such a degree that the latter is able to produce intestinal lesions in animals. "If one takes three animals, inject into the peritoneum of one a slight dose of streptococci, into that of the second a slight quantity of typhoid bacilli, these animals are ill for a day or two, but recover rapidly; the third one, which has received a mixture in equal proportions of both cultures, quickly dies, often with the symptoms of stupor, diarrhœa, fever, and the small intestine is seen at the autopsy studded with prominent vascular patches."

I may seem to wander away from clinical teaching in recalling these facts, and yet this is clinical.

To resume, we started from the fact that there are typhoid abscesses, and we have seen that Eberth's bacillus can cause all kinds of lesions, bone suppurations, subperiosteal gummata, simple sero-fibrinous, purulent pleurisy, outside of typhoid fever, a hemorrhagic pleurisy, lastly, a special infection, when Eberth's bacillus is associated with the streptococcus.

What conclusions shall we draw? That Eberth's bacillus, like most pathogenic microbes, produces lesions absolutely dissimilar, though depending on the same cause. This cause ought always to be investigated; it should form the basis for a classification of diseases. It would be easy to draw up the account of streptococcia, pneumococcia, and so forth.

I do not intend to continue further these considerations but I wish to impress upon your minds the fact that Eberth's bacillus can live a long time in the organism, eight months at least. We thus understand the relapses and the recurrences of typhoid fever, we know that they are due to the bacillus which has continued in a latent state in the organism. In one word it is a bacillus of which one must beware.

SOME THOUGHTS ON TYPHOID FEVER.

By E. CHENERY, M. D.,
Boston.

BARRING what we know and do not know on the germ etiology of typhoid fever and its specific treatment by anti-microbic remedies, I wish to say that there are three points in the management of this grave disease worthy of general observance. The conservation of the strength; the avoidance of irritants to the alimentary tract; and supplying plentiful diluents for the work of the kidneys.

I think it stands to observation that nutrition is practically suspended and continues so till the crisis is past and convalescence begins. If that be so, we can hope for very little from feeding, and must see that every particle of strength which the patient naturally has is conserved by keeping him in bed and still, and excluding all reducing measures. And, further, I would ask, have we not often injured typhoid patients by

crowding them with food substances with the idea that we were keeping up their strength, when those substances were themselves more irritating than nourishing? Even milk, crowded as food, I believe to be injurious.

Considering the fact that the interior of the intestinal tract is extensively inflamed, particularly in the early stage, and, if not attended with diarrhœa, is always greatly sensitive to the action of cathartics, the utmost care should be exercised lest anything of an irritating nature be got down the throat to aggravate.

My medical life began so near the time when the distinction between this fever and the typhus was drawn, leaving the latter as the inhabitant of the other side of the Atlantic and not here (though the fever here was so named), I cannot wonder that many physicians then did not readily get the new idea. Hence they continued to treat the typhoid as the typhus, though the bowel conditions of the two were so widely different. This mistake, or rather want of information, led to much rough and irritating drugging, and with very great harm as I had reason to believe. I saw so much of bad cases and deaths from lobelia, cayenne, bayberry, blood root, etc., that my mind sharply discountenanced this sort of medication and adhered to, what was to me, a more rational and soothing one.

Two years ago I saw an undoubted case of typhoid in a man of thirty-five. The physician in attendance, regarding the case to be a general run-down condition, plied the first stage with tonics and stimulants with the result of aggravating the whole course of the disease, which, in the last week, presented so much bowel trouble as to kill, whereupon he returned it as a case of dysentery, and death by it. I have in mind another case, treated by hot-drop remedies. I saw the case before the man died and noticed a condition of the lining of the mouth, I had never seen, nor have I seen the like since. The membrane was swollen up two or three times its proper thickness as though soaked, like a piece of tripe. What could produce this appearance other than the treatment, I know not. This case is mentioned rather as a matter of history, than because any modern doctor of intelligence would be guilty of giving such hot stuff; for neither this nor the former case were in the hands of ordinary medical intelligence.

In the last stage, that of ulceration, when the diffused inflammation has disappeared and the action is confined to a few patches and points where necrosis of tissue is going on, then a local stimulation, as that by turpentine, is the most useful remedy we have, and I most cordially invite every physician who has not read Dr. George B. Wood on the use of turpentine at this stage to be sure and read his Practice under this head. I have followed his advice over and over so many times I should hardly know what to do without the remedy, or some other thing closely allied to it.

Our younger physicians know nothing of the disastrous course of fevers. In olden times when it was against good practice to administer diluents, I came in on the border line and yet I saw enough to give me the most terrible ideas of the typhoid fever. Now, we understand that that group of symptoms—the typhoid—is not a necessary part of the fever at all, but results from the poisoning of the system by the nitrogenous compounds which the kidneys are set to carry off but which they cannot do unless supplied with plentiful diluents. Now it is to this point, more than to its nourishing quality, that I regard the free administration of milk to be the exact thing. Yet in recent years, articles have appeared in the journals advocating the nutritive relations of milk in this disease, one writer considering it necessary to give three or four quarts a day in order to sustain the patient with it. Thirty-eight years ago, I worked my way into the use of milk in the typhoid, giving it to support. Finding cases to be almost always mild in this course, as compared with the cases treated otherwise by those who did not dare to give milk, I came to the conclusion that the benefit of the milk treatment turned rather on the medicinal effects of the milk on the kidneys than on it as a nourishment. In a case where the patient objected to the milk, I accomplished about the same results, by thin mucilage of Irish moss, putting into it a little cranberry jelly to give it flavor. Of this she drank freely for many days

making a good recovery without the "typhoid symptoms."

Avoiding beef teas and liquors, and giving in the first stage, liquor ammonia with nitrate of potassa, and milk or moss mucilage as the diet, with occasional doses of calomel as required, and turpentine in its time, my cases have nearly all been mild, with little or no trouble from the so-called typhoid symptoms, which are the chief horror of this fever This course, with excess of fresh air and free and frequent sponging with tepid water, has almost always borne me in confident expectation of finding convalescence by the eighteenth, nineteenth or twentieth day, one case being decidedly on the recovery in fifteen days.

I have had two relapses after the patients began solid food. My preceptor had a similar case, as well as that of a man who relapsed the second time from solid food. This teaches us to make haste slowly till the diseased surface of the bowels has had time to heal.

I have known of perforations, but never had a case, unless it occurred in a girl of twelve, in whom an abscess formed near the top of the right ileum, which began far down. It discharged fœtid matter when opened. It began by a deep seated pain about the time when perforations take place, and at a point corresponding to the lower part of the small intestine where they principally occur.

I have had three or four cases of hemorrhage, but none proved fatal except one, where the bleeding went on two days without my being notified of it. On making my visit, I found that the hemorrhage had done its work, the woman being in a sinking condition. This case had been mild, progressing with no unusual symptom. I visited only every other day, instructing the mother to let me know if anything new came up. She did not notify me, and the hemorrhage began soon after my visit and went on till I saw her two days later. I cannot say what the outcome would have been had I been called. I should at least have had the satisfaction of trying. My feeling has always been that this life was thrown away.

I saw one case, that of a young woman of seventeen, whose flesh became so sensitive that we had to handle her on a sheet. An old doctor, who was widely celebrated in this disease, pronounced it complicated with general phlebitis, and would die, as he had always lost such cases. However, though then an undergraduate, I fought on and saw her restored, yet the many purple spots and particularly tender places eventuated in abscesses, so that I opened more than fifteen in the course of her convalescence. She contracted the fever of my preceptor, who was sick with it, being a servant in his house at the time. Her mother took the fever from her, and presented in the early stage both feet perfectly scarlet half way to the knees.

I saw a lad of sixteen, who was under the care of an eclectic. He went through every variety of complication—excessive epistaxis, hemorrhage from the bowels, stoppage of water, pneumonia, etc., and finally died of septicæmia, on the forty-third day of his sickness. I have not had such a case in my own practice, and have often wondered what would have been the course of this case had it at first received the treatment suggested above, or the more special germicidal treatment others are to-day so warmly recommending. Possibly results would have been the same.

65 CHANDLER STREET.

THE TREATMENT OF TYPHOID FEVER.

By HERMAN D. MARCUS, M. D.,
[Resident Physician, Philadelphia Hospital.]

So much has been said about the treatment of typhoid fever, and so well has been every method defended, that it seems this subject should be well nigh exhausted, but the importance of this disease in this country gives nearly every practitioner a stimulus to make new researches and report fresh successes.

There is no disease which has found a wider range of treatment than enteric fever.

Since Eberth discovered the presence of a bacillus in the stools, the tendency seemed to be to find some drug, which, by its antiseptic properties, will destroy this bacillus. A great many writers have advocated the use of such drugs, which, by their laxative actions, will remove the

bacilli present, decreasing their numbers in the intestines, thereby diminishing their virulent powers.

If we could find a drug which would remove these germs entirely, freeing the bowels of their poisonous influence, even then would our work be only half done. True, the patient would be greatly benefited by such a drug, but our duty to the community at large would be only half done, knowing, as we do, the liability of infection through the stools.

Some years ago, Dr. Waugh advocated in THE TIMES AND REGISTER the use of sulpho-carbolates in the treatment of typhoid fever, and, as time progresses, we find daily more cause to adopt his suggestion.

Sulpho-carbolate of zinc, which undoubtedly ranks foremost in the group, is a true intestinal antiseptic. There are other drugs whose action is the same, but none act surer, quicker and more thoroughly than the sulpho-carbolate of zinc.

When this drug is administered properly and in time, it will achieve wonderful results, and I believe that the death rate, when employing this salt, is less than one per cent., a percentage which is far below that of other methods.

The mode of administration is as follows: At the outset, five grains should be given, repeated in three hours, and when the fever abates and the stools are diminished in number, two to three grains every three hours. The drug must be kept up until the peculiar typhoid diarrhœa has entirely ceased, and with it, the fever.

Under such treatment the temperature will never be abnormally high, and the stools will lose their offensive odor and be lessened to two or three a day. No nervous symptoms or intestinal complications will arise, and the patient will at no time fall into this so-dreaded "typhoid" state.

Combined with this treatment the sanitary and dietary precautions peculiar to typhoid fever must be carefully observed. The stools must be thoroughly disinfected before removing from the room. The bed clothes and garments worn by the patient should be washed in an antiseptic solution (bi-chloride of mercury 1-500 or 1-1000), and the sick room well aired. The nurse must, at all times, observe strict cleanliness, in fact, should use antiseptics whenever handling the patient, before and after.

The diet should consist of milk solely, and this should be well boiled and peptonized. The amount of milk that may be given daily varies greatly, and it is wisest to give small amounts repeatedly. No water should be given to drink, and if the patient is very thirsty, ice may be given to suck. Champagne will be found a very refreshing as well as stimulating drink.

Stimulants should not be employed too early and *over* stimulation must be carefully avoided.

If such treatment is carefully followed out we will have the very best results and hardly any failures.

In conclusion I wish to quote the cases which came under observation:

Mrs. M., aged 42 years, treated for eleven days with calomel, salol and sponge baths. On the eleventh day her husband called me in. I found the lady very much debilitated, temperature 103⅘°, reported ten to twelve very offensive stools. Tongue was thickly coated with a black deposit, sordes on lips and teeth. Prescribed five grains sulpho-carbolate of zinc every three hours. On the third day the stools numbered four or five, the temperature had fallen to 99⅗°, the tongue had lost its black coating and the patient was brighter and as she expressed it, "felt well enough to get up." About sixteen days later the patient had entirely recovered.

R. F., age 24 years, was under treatment for about two weeks, when I was called in. His history was that up to four days previously he felt perfectly well, when his stools increased in number to twenty to twenty-four daily and temperature of 104⅘° at six P. M., when I first saw him. I ordered sponge bath, thereby reducing the temperature to 102° and ordered five grains of sulpho-carbolate of zinc every two hours. Five days later patient was greatly improved. Temperature had gradually receded until on the fifth day it was 99°; only two to three stools were passed daily. Patient improved rapidly and left the bed on the twenty-ninth day from the outset of the disease. No relapse or sequelæ.

The Times and Register.

A Weekly Journal for Medicine and Surgery.

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TYPHOID FEVER.

JUST now St. Louis shares with Chicago an unenviable prominence as the home of typhoid fever. The Medical Fortnightly says that during November, 1918 cases were reported. Most of these cases occurred in the parts of the city supplied with city water; only 71 cases out of 1417 coming from the well and cistern section. Of 2086 houses examined, in 1417 the plumbing and sewerage were in good order. The cause of the epidemic appears to be, as Dr. Lewis claims, the city water. Three large sewers empty into the river above the water-works; and the "filthy contents of these sewers may be seen almost as separate streams following the current towards the intake."

The *Review* says the city chemist has analyzed the city water and pronounced it as pure as Mrs. Cæsar. Ohmann-Dumesnil does not express a decided opinion, but seems inclined to lay the blame on the comet. It must go hard with a St. Louis man to acknowledge that any harm can come from Mississippi water; when from time immemorial every inhabitant of the city has sworn by the muddy mixture, claimed that no germs could live in it, and that the mud was nutritious. At our last visit to that charming city, we let a glass of water stand over night. In the morning there was a heavy, ropy sediment occupying one-third of the glass, and the supernatant liquid was still opaque. We mentioned this to several influential citizens, but got no sympathy; and we must acknowledge that, mud and all, it was remarkably pleasant to the taste. But the bacillus of Eberth will flourish even in the soil of Missouri, when fertilized by the sewage of a great city.

* * *

In the *American Journal of Pharmacy*, Mr. George M. Beringer discusses the value of Ehrlich's test for typhoid fever. A small quantity of a one per cent. solution of sodium nitrite is added to the urine and then a quantity of a saturated solution of sulphanilic acid in a five per cent. solution of hydrochloric acid, followed by the addition of ammonia. The test is stated to produce an orange-red color.

Dr. C. E. Simon, of the Johns Hopkins hospital, recommends the contact method and the following modification of the test: "Solution 1, a saturated solution of sulphanilic acid in 5 per cent. hydrochloric acid; solution 2, a 5 per cent. solution of sodium nitrate; 40 cc. of solution 1 is mixed with 1 cc. of solution 2, and an equal amount of urine is added and mixed. 1 cc. of ammonia is now carefully run down the side of the test tube; at the junction of the two liquids there will be observed a ring of the characteristic color varying from an eosine rose to a deep garnet red. The color is due to the change of the amido-benzene-

sulphonic acid to diazo-benzine-sulphonic acid, by nitrites or nitrous acid in presence of an alkali.

Mr. Beringer states that he obtained the typical reaction with urine from remittent fever, and even from non-febrile cases. Many substances were also tested, and among them several gave the reaction supposed to be characteristic of typhoid urine. Albumen gives an orange to red line; peptone a pale red; phenol and creosote a dark red, identical with that of typhoid urine. The sulpho-carbolates gave a pale eosine red; beta-naphthol, a magenta; resorcin, a dark red-brown; thymol and eugenol, a red; gallic acid and pyrogallol, a dark red, etc., etc. From this he concludes that while the absence of the reaction may indicate the absence of typhoid, the presence of the reaction would not warrant the diagnosis if unsupported.

* * *

Dr. Northrup, in a paper read before the American Pediatric Society, claims that typhoid fever in a child under two years of age has never been observed in the New York Foundling Asylum, and that swelling of Peyer's and the mesenteric glands with enlarged spleen, at that age, have not the same significance as in adults. He bases his views upon the absence of the typhoid bacillus.

Earle, however, (*Arch. Pediatrics*) claims to have had a case in a child six months old. The diagnosis was made from the autopsy, at which Peyer's patches were found to be ulcerated and the mesenteric glands swollen. But—and this confirms Northrup—no bacilli could be found in either ulcers or spleen.

Eberth obtained typhoid bacilli from a twenty-weeks' fœtus, expelled by a woman during an attack of typhoid.

In the discussion of these papers, Drs. Seibert and Winters said they had never diagnosed typhoid in children under two years of age, while Blackader thought they occurred, though rarely.

Dr. Christopher pointed out a means of detecting the rose spots. He places a finger on either side and stretches them until the spot disappears.

Dr. Seibert said he treated all typhoid cases by irrigation, of the colon, after Mosler's example, but with pure water.

* * *

The only infallible test of typhoid fever is then the detection of the bacillus; as we cannot put faith in Ehrlich's test, or even in the evidence of an autopsy.

A good deal of valuable material prepared for this week has been crowded out, and will be published next week. The great special number, devoted to the treatment of consumption of the lungs, will appear on January 6th. We will endeavor in future to alternate our special issues with general ones, in order to accommodate the increased amount of material being sent to us. Those who receive sample copies of this issue can obtain the next, or the phthisis special, by sending ten cents. But the better way is to send $3 00, and get the journal for a year, with all the specials.

In a paper read before the Section of Physiology and Dietetics, American Medical Association, Dr. J. Mount Bleyer says:

"I have substituted kumyss, made from Kumysgen (the new dry form of kumyss) in all cases where I formerly employed liquid kumyss, and find it much superior in many respects, both in regard to convenience of handling and in the results obtained. It is uniform in composition and I find most patients will take it readily, which is not the case with the liquid kumyss."

This enables the physician to prepare, at a moment's notice, a very pleasant and nutritious form of kumyss. The value of this improvement is manifest.

Treatment of Typhoid Fever in the Philadelphia Hospitals.

ST. AGNES HOSPITAL.

IN answer to your questions concerning the cases of typhoid fever treated here, I send the following replies. Hope they will give some idea of what you desire.

During the months of August, September, and October of the present year, ten cases of typhoid fever were treated in this institution.

DIET.—The diet consisted of fresh milk given at intervals of two or three hours; pre-digested where stools showed indication of mal-assimilation. Beef tea was sometimes used in cases where patients showed great repugnance to milk.

GENERAL TREATMENT.—Temperature was controlled by the cold bath, cold pack or sponging, depending upon the number of baths necessary, strength of patient and evidence of hemorrhage; the cold bath being used wherever not contra-indicated.

The typhoid condition, dry coated tongue, etc., was met by turpentine.

Tympanites by cold cloths, Hoffman's anodyne and occasionally the rectal tube.

FEVER.—Temperature was taken every few hours and patient placed in tub at 103° F. Usually bath was given before any definite idea of the range of temperature could be gotten. Fever continued about the usual number of days and in only one case, that of relapse, was it prolonged.

DIARRHŒA.—Only one or two cases showed any diarrhœa, constipation being rather marked in the remainder.

HEMORRHAGE.—Two cases showed hemorrhage. One in the third week, which terminated fatally. The other about the end of the second week had seven or eight severe hemorrhages, followed by perforation, peritonitis and death.

DELIRIUM.—In one case, that of perforation, the delirium came on after the peritonitis set in.

One other was delirious at the time of and two days preceding admission. The delirium disappeared after the first bath and never returned.

LUNG COMPLICATIONS.—No cases of pulmonary involvement beyond the customary slight bronchitis.

HEART FAILURE.—No case of death from such cause, although all were stimulated when heart showed signs of weakness.

USE OF STIMULANTS.—Whisky was the stimulant relied on in all cases of typhoid, given in quantities varying from two or three to twelve or fourteen ounces in the twenty-four hours. Strychnine was occasionally used in doses of $\frac{1}{20}$ of a grain.

DISINFECTION OF STOOLS.—All stools from typhoid cases were at once disinfected with lime or carbolic acid.

RESULTS.—Of the ten cases two died. Both fatal cases had hemorrhages and one perforation.

The cases this year of typhoid are much below the usual number.

D. D. SAUNDERS, JR., M. D.,
Resident Physician.

GERMAN HOSPITAL.

IN compliance with your request to furnish data in regard to typhoid fever as seen and treated in the German Hospital, I would take pleasure in stating the following: Prior to 1889, all typhoid fever patients were treated in the "old fashion," with little or no intestinal antisepsis, and chemical antipyretics for the fever. In 1889, Prof. L. Wolff treated all enteric fever patients with chemical antipyretics, but used naphthalin in all cases as an intestinal antiseptic. Under this treatment the mortality was 10 per cent. while under the other plan the mortality ranged as follows:—1884, 23.4 per cent; 1885, 11.4 per cent; 1886, 20.4 per cent; 1887, 17.4 per cent; and 1888, 13.2 per cent. In 1890 the cold bath treatment of Brand was instituted, the result being for the year, six deaths in 134 cases treated. In 1891, 131 cases were treated and nine deaths resulted. Up to the present time sixty-seven cases have been treated in 1892, with but five deaths. One of these deaths was due to pneumonia developed after all symptoms of typhoid fever had subsided and another died of peritonitis, which attacked the patient after having been convalescent for about two weeks. The post-mortem examination revealed only healed ulcers and the peritonitis could not be accounted for.

At present all cases are put on milk diet, no solid food being given until the temperature has been down to normal for at least eight days, and even then but light diet is given, the food being increased in amount gradually. The general treatment is calomel, hydro-naphthol (intestinal antiseptic), HCl, whisky in asthenic cases, and baths at temperature 103°. Baths 85°. Diarrhoea not checked except by the hydro-naphthol. Hemorrhage treated by ice applied to the abdomen, ice water injections, and turpentine internally. Delirium treated with bromides, and straps used if necessary. Few, if any lung complications found. Heart failure noticed in two cases one of which died. Stimulants are used only when needed, they being whisky, digitalis and strychnine. Trusting this will fulfil all you desire, I am,

A. D. WHITING, M. D.,
Med. Res.

ST. MARY'S HOSPITAL.

OUT of seven cases of typhoid fever, the general method of treatment was expectant symptomatic. Brand method of treatment was carried out in three cases, and one relapse, coming in in the relapse. No mortality. Temperature of each of these reached 105°. Diet, milk in all the above. Diarrhœa checked by a pill of:

℞—Opium.
Acid Carbol.
Pulv. Iodin.
Quin. Sulph.

But none was over three stools during one day, so were left alone.

Delirium by cold bath, opium and stimulants. No heart failure. No lung complications. Stimulants were given moderately from start, and increased as was deemed necessary. Disinfection of stools by bichloride and chloride of lime.

One case by hydro-naphthol gr. ij. every three hours. Constipation was obstinate, and was given gr. iv. of calomel night and morning, and enemas of creatin and glycerin. Temperatnre ran to 104°.

Diet—milk and aq. calc., beef tea, broths, boiled water, and ice to cool same. No stimulants. There was no delirium, hemorrhage or lung complications.

One case, girl aged ten years—Brand treatment was started, but was abandoned from depressing symptoms, and antifebrin gr. ij. every three hours was given instead. Temperature ran from 103 to 105° under Brand treatment, and 99 to 101° under antifebrin. No hemorrhage. No constipation till late, when it was very characteristic.

Stimulants, brandy ℥j every two hours.

Diet—milk.

One case—woman, single, aged twenty-three—stated that she had been feeling unwell for only three or four days, but this disproved by the other statements. Was admitted with temperature of 103°, and was given bath every time temperature went over 102.5°, being watched by attendant in ward. On the second day showed moderate delirium, with temperature of 103°; third and fourth days, same. On evening of fourth day delirium became furious, temperature went from 103 to 105°: was reduced, but persisted in rising. Was given opium every two hours, and ice to head and neck. Pulse rapidly became weak, fluttering, going 104 to 120, 140, 160, 170, when death soon terminated, from exhaustion.

Diet—milk and beef tea, broth, etc.

Diarrhœa only moderate. Stimulants were given from start. Stools were disinfected by bichloride of mercury.

O. D. SCHAUL, M. D.

PRESBYTERIAN HOSPITAL.

SINCE September 1st, 1892, there have been fifty-nine cases of typhoid fever, of whom twelve are still under treatment. The mortality was three. The sex of the patients about equal numbers. I used hydrotherapy in all the cases with most gratifying results. The other treatment was wholly symptomatic.

Among the rarities was a typical case in a child of four months, and another in a woman of seventy years. As complications I had two cases of periostitis of the pelvis. Dysenteric symptoms appeared in six cases; constipation was the rule, but a few presented most persistent cases of diarrhœa. Seven cases were in children under twelve years. In some instances families were represented by at least two members. The habitats of the large major-

ity of our patients are the adjacent localities, poorly drained or not drained at all.

WALTER R. WEISER, M. D.,
Resident Physician.

UNIVERSITY HOSPITAL.

THE treatment of typhoid fever at the University Hospital is as follows:

1. Milk diet.

2. Absolute rest in bed; enforced use of bed pan and urinal. Disinfection of stools with chloride of lime.

3. Tub bath whenever temperature reaches 102°⅕.

Rules for bathing:—*a*. When temperature of patient is below 101° temperature observation to be made every three hours; when above 101°, every hour, when 102° every half hour.

b. Temperature of bath 70°.

Tub is wheeled aside of the bed and patient lifted in by two nurses, one holding the patient under the arms, the other by the legs.

c. Systematic rubbing is kept up during the bath, and afterwards if the patient shivers much.

d. Water (temp. 50°) is poured over head and shoulders at the beginning of the bath.

e. If desirable a hot drink such as hot milk, milk punch may be given the patient during the bath. If temperature is difficult to reduce a glass of ice water may be given instead.

f. Patient remains in bath from fifteen to eighteen minutes.

If temperature tends to remain high, cold cloths or an ice cap is applied to the head.

Above is the detail of the bath treatment used here. No medicines are given constantly. The vast majority of cases require whisky in greater or less quantities.

Indications are treated as they arise. Our rule is to keep patient in bed and upon milk diet, for one week after the temperature reaches normal.

In regard to the prevalence of typhoid fever since September 1st, and the locality of the residences of the patients, I would state that we have had ten cases of it in the University Hospital since the above mentioned date and that six of these have resided in West Philadelphia within a radius of one mile of the hospital.

Two patients lived in the neighborhood of Twentieth and Walnut streets, the other three coming from other cities.

The cases have been for the most part uncomplicated, and our death rate has been *nil*.

In one case a relapse occurred on the thirty-first day, after an apyretic period of seven days. This occurred despite the fact that the patient occupied still the dorsal decubitus, and was still on a milk diet.

The treatment pursued at this hospital is the Brand treatment. Whenever the temperature of the patient reaches 102⅖° he is plunged into a tub of water (temperature of 70°) and allowed to remain for fifteen minutes. The effect of the baths on the temperatures of different patients varies. Some drop immediately to normal or thereabouts, while others require a repetition of the baths to keep the temperature below 102⅕°. In none of the bath cases was there observed any delirium whatsoever.

JAY F. SCHAMBERG, M. D.,
Resident Physician.

CHILDREN'S HOSPITAL.

1. Diet—milk and limewater.
2. General treatment — symptomatic, quinine suppository gr. ii, bis die, whiskey p. r. n.
3. Fever treatment — cool sponging when temperature is 103° or over.
4. Diarrhœa treatment — injection of starch-water and laudanum p. r. n.
5. No hemorrhage.
6. Delirium not excessive.
7. No lung complications.
8. No heart failure.
9. Stimulants as necessary.
10. Chloride of lime.
11. Recovery.

ALFRED HAND, JR., M. D.,
Resident Physician Children's Hospital.

WOMAN'S HOSPITAL OF PHILADELPHIA.

THROUGH the kindness of Dr. Frederick P. Henry, Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania, I am provided with a brief resumè of the methods advocated by himself in the treatment of typhoid fever,

and given in detail in Hare's Therapeutics, Vol. II., this being the plan of management recently followed by us, both in the wards and out-practice of the Woman's Hospital.

Cases of fever being excluded from our wards, and only treated when occurring inadvertently in the hospital, our experience as to numbers does not equal that of many institutions. With reference to the cases treated, however, I should like to add our testimony to the efficacy of the methods approved by Dr. Henry. In addition to the cold sponging to which he refers in his resumè, I should like to call attention to our employment of a metallic reservoir for ice, the invention of Mr. Edwin Magill, of South Bend, Washington, which we used with very gratifying results in cases of excessive high temperature and marked head-symptoms.

This device, which surrounds the head at a distance of a few inches from it, if kept continually filled with ice, and produces thus a layer of cool air about the head, which has a striking effect in reducing the temperature and quieting delirium. In two desperate cases recently treated by us, in whom the temperature reached 107° Fahr. on several occasions, the application of this apparatus produced in a short time a marked fall, and was less depressing in its results than the cold plunge bath treatment.

The tendency to hemorrhage was controlled by the use of ice upon the abdomen and hypodermatic injections of ergotine. In threatened heart-failure, hypodermatic injections of strychina, digitalis, or caffeine were employed as indicated, and alcoholic stimulants were administered by mouth. The ordinary treatment of an uncomplicated case is thus given by Dr. Henry:—"The treatment of typhoid fever pursued at this Hospital is largely symptomatic. The temperature is kept within moderate bounds by cold sponging, repeated as often as may be necessary to accomplish this purpose.

The diet is composed chiefly of milk, of which, however, there is rarely given more than three pints in the twenty-four hours. Water is freely administered. Beef-juice or some reliable preparation of beef-peptones is also given when diarrhœa is absent or moderate. Gelatine and peptonized milk-jelly are used chiefly as "relishes" toward the close of the febrile period.

Medicinally the main reliance is on intestinal antisepsis, which experience has shown to be best accomplished by the use of thymol in pill or capsule, from twenty to forty grains of this drug being given during the course of twenty-four hours.

Stimulants are not given as a matter of routine, but only to meet the well-known indications for their employment.

ANNA M. FULLERTON,
Physician in charge.

Letters to the Editor.

TYPHOID FEVER.

SINCE I reported to you my opinion of sulpho-carb. zinc, I have tested it in eighteen more cases typhoid fever. I am still stronger in my opinion of its value in cutting short the disease. I believe, too, it is valuable in hemorrhage of the bowels. I just treated a young lady who had fourteen severe hemorrhages, and I gave her eighty grains sulpho-carb. in twenty hours, with only the addition of sub-nit. bismuth—she recovered. I at this writing have four cases in one family—use the zinc and there is not a particle unpleasant odor after a move of the bowels. When temperature is above 102° I gave acetanilide two to three grains with one of sulph. quinine every three to four hours. I think you have made the greatest discovery of the age in the zinc treatment.

W. S. CLINE, M. D.

WOODSTOCK, VA.

I have perused your report on the treatment of typhoid fever with the sulpho-carbolates, read before the Pennsylvania State Medical Society, in 1887.

I have been using the sulpho-carbolate of zinc in the treatment of typhoid fever since I read your article with the most gratifying results. I have used it in every case treated, and have used but little else. Every case made a good recovery, and I have not had a hemorrhage. I put my patients on the zinc in

the beginning, and keep them on it throughout. I believe I have aborted several cases. I would like to know what your experience has been since you reported your cases in '91. I have advised a number of physicians to use your plan of treatment, and they report most excellent results.

J. D. COLE,

NEWBERN, TENN.

[I have continued the use sulpho-carbolate since 1891, in every case of typhoid fever treated by me, and have not had a death. Many of my old students have reported to me similar unvarying success.—W. F. WAUGH.]

The Medical Digest.

GERMAN NOTES.

TRANSLATED BY HERMAN D. MARCUS, M.D.

[Resident Physician Philadelphia Hospital.]

TYPHOID FEVER.

DR. W. E. TRESSIDER recommends following treatment, which he has found of great value in the Nottingham hospital:

The diet consisted of milk, given in quantities of one-half pint during the fever—solid food was only permitted six days after normal temperature was established. If the temperature rose over 39° C. during the day or 40° C. during the night, sponge baths were given every four hours.

Intestinal hemorrhages are quickly controlled by opium, which may be given even in the presence of perforation or peritonitis; hypnotics were prescribed to counteract insomnia and delirium.

Naphthol was found useless, in fact it caused at times vomiting and cardiac depression.

Oakum is preferable to lint, sponges, flannel or muslin as a cleansing material. All bed clothes and garments must be put in an antiseptic fluid. The nurse must cleanse her hands antiseptically before and after giving food—*Brit. Med. Journal.—Deutsche Mediz. Zeitung*).

F. W. Anderson has been using *perchlorate of iron* for a number of years in the treatment of typhoid fever and has had no death to record, if such treatment was employed before fatal complications, such as perforation, occurred.

The treatment consists in the administration of five drops of the liquor ferri sesquichlorati every hour day and night until the temperature remained normal for eight days. The iron is combined with thirty drops of glycerine or ʒi of simple syrup, a few drops of tincture of cinnamon or water, so as to make the dose palatable. If the mouth or throat becomes dry it is advisable to give about 4-5 grains of bismuth about ten minutes before administration of the iron.

With this treatment the diarrhœa subsides in a few days, and then he recommends a mild aperient daily until the iron is discontinued. The temperature becomes rapidly normal and no dangerous complications arise—*British Med. Journal.—Deutsche Medizinal Zeitung*.

Paul Werner recommends chloroform in the treatment of typhoid fever. He has treated, since November, 1890, to August, 1892, 126 patients with this drug, and uses it as follows:

One to two teaspoonfuls of a one per cent. solution of chloroform are given every hour or two (day and night). This dose is gradually decreased according to the remission of the symptoms, until, finally, only a few spoonfuls are given in twenty-four hours.

Under such treatment he has never lost a patient. The tongue and oval cavity did not show the black, foul-smelling coating; thirst, which generally becomes unbearable, disappeared in a day or two. The most severe diarrhœa subsided gradually; tympanites was quickly relieved, if already present.

No nervous symptoms developed during such treatment, and if such were already present, they were quickly relieved, most generally in a day or two.

Patients treated with chloroform had no relapse and no sequelæ were observed.

Werner thinks that the action of chloroform is symptomatic; he believes that it prevents the formation of the specific decomposing products in the intestines.

He prescribes this drug, if the patient has not passed the tenth day of the disease.—*St. Petersburger Med. Wochenschrift.*

News.

THE ONLY KNOWN STERILIZING APPARATUS.

THE recent visitation of cholera has done more in six months to familiarize people with the theory of disease germs than what was probably learned before in six years. That this disease is likely to appear again in the Spring is generally admitted, and it behooves one and all to take those precautions proven to be preventive. Drinking water and milk are the principal mediums of conveying into the system the germs of cholera, typhoid fever, consumption, measles, scarlet fever, erysipelas, and other kindred infectious diseases. Bacteriologists are agreed that filters do not destroy disease germs, but rather serve as a breeding place. Water sterilized by chemicals is not more reliable, and water sterilized by boiling in a vessel not steam tight, cannot always be relied upon, as the heat cannot be raised above 212 degrees. The effective sterilizer, therefore, must be one which subjects the water or milk to a heat of from 212 to 260 degrees Fahrenheit, and yet retains all the salts to which it owes its tonic properties, and all the free gases which render it refreshing and pleasant to the taste. To be fully practicable, the system must be of simple construction, wholly automatic, and easily applied in any household. Such an apparatus is the one made by the Dr. West Sterilizer Manufacturing Company of this city. This apparatus is composed of a self-cleaning filter, a thermal valve with circulator attached, and a self-cooling air-tight tank for storage of the sterilized water or milk, with connecting pipes attached, to the ordinary system for heating water for household purposes. The filter is of unique design and self-cleaning. It not only separates the impurities held in suspension by the water, but discharges these through an independent outlet. Its method of working is as follows: The circulator attached to the thermal valve is composed of outside and central chambers. The outside chamber receives and discharges the hot water from the water-back of the stove or range utilizing it for heat, while the inside or central chamber receives and retains the filtered water for sterilization. The thermal valve, through which the central chamber discharges, is operated by mercury, which expands or contracts according to the rise and fall of the temperature of the water in the central chamber. When the temperature is raised to 212° the expansion of the mercury opens the valve and the sterilized water is discharged through pipes into the storage tank. As soon as the temperature of the water in the central chamber falls below 212° the mercury contracts and closes the valve. This valve is made adjustable and can be set to open or close at any desired degree of heat; preferably for sterilizing water at 212 degrees and for milk at 230 degrees. The storage tank is air-tight and arranged so as to cool the sterilized water to the temperature of hydrant water. From this tank it is conveyed through pipes to any part of the dwelling desired; as for instance the ice chest of the refrigerator, coiling the pipe therein, placing ice on the coil, and furnishing ice water without contaminating with disease germs that may be present in the ice. Water and milk thus sterilized and stored up under pressure in air tight tank will keep from decomposition for an indefinite length of time. The whole system being automatic in its operation does not need the attention of servants, nor can it be tampered with in any of its parts, while it can be readily attached at a nominal cost to the ordinary domestic house boiler or to any steam boiler or pipe. Without question this is the simplest and most effective apparatus of the kind upon the market, and bears the strongest kind of an indorsement from Henry Leffman, W. Joseph Hearne, Surgeon Jefferson Medical College, and many others. When the Philadelphia Board of Health recently fitted up the Georgeanna as a quarantine steamer, they adopted this sterilizing system, of which the physicians and officers speak in the highest terms. The works of the company are located at Bound Brook, N. J., and the officers are Andrew Lane, President; Dr. S. L. West, Vice-President; L. Alvin Zohe, Secretary; and Elie Erismann, Treasurer. The Philadelphia office is located at 633 Arch street.—*Journal of Commerce.*

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